

Radar evidence for past melting and present water distribution beneath Rutford Ice Stream, West Antarctica.

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I collected radar data in the onset region of Rutford Ice Stream where previous seismic surveys indicated free water at the bed in a possible canal system. The objectives were to use the radar to map the bed topography in detail and to determine if there was a correlation between seismic and radar reflectivity which would allow mapping of water distribution.

I used the British Antarctic Survey's Delores system (Deep Look Radio Echo Sounder, a daughter of the Washington and St. Olaf radars), which is a 1 MHz monopulse radar. (See the poster at this meeting for further technical details). The data show internal reflections through the full 2900 m thickness of the ice stream and a bed reflection with very good signal to noise ratio.

My primary observations are:

- 1) There is a lowermost ice layer that varies in thickness from 200 m to 600 m,
- 2) The amplitude of the bed reflection is as much as 13 dB greater on the downslope side of basal highs than elsewhere, and
- 3) There are significant differences between the location of regions of seismic high amplitudes and radar ones

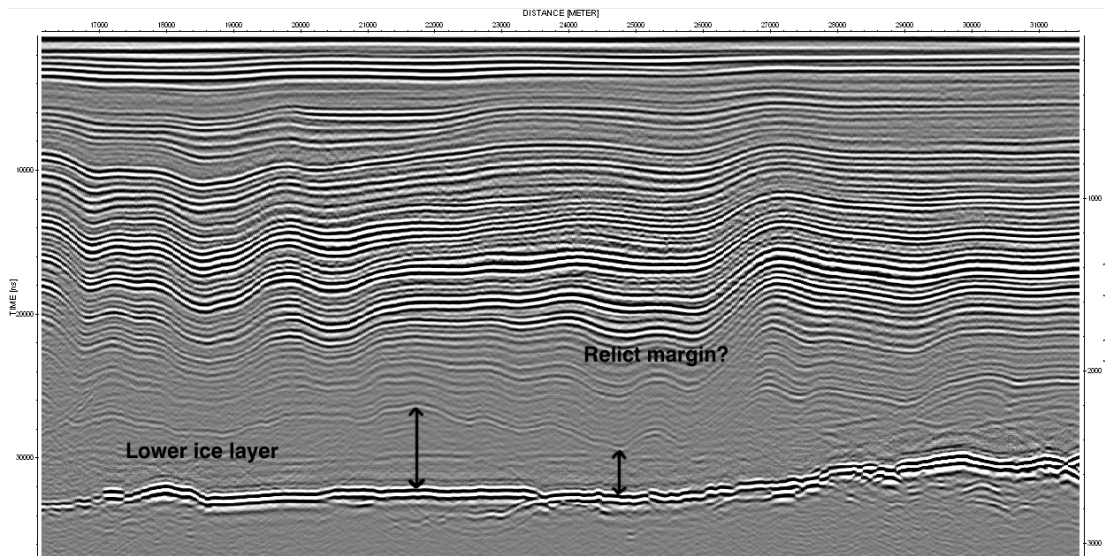


Figure 1. Part of a radar cross-section of Rutford Ice Stream. The lower ice layer thins, suggesting localised basal melting, perhaps in a relict shear margin.

The questions to be answered are:

- 1) What is the present basal water distribution?
- 2) What past episodes of basal melting have taken place?
- 3) Has there ever been re-freezing at the bed?